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AVIATION WEEK & SPACE TECHNOLOGY
28 April 1986

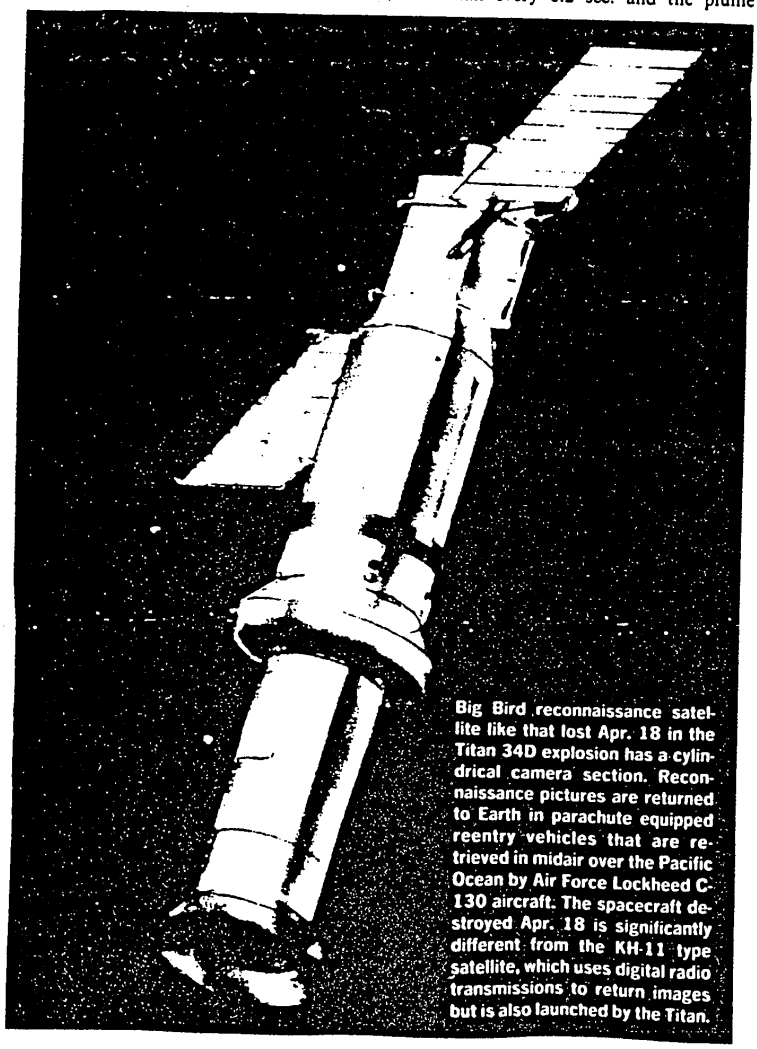
Titan Explosion Cripples U. S. Launch, Surveillance Capability

Washington—The U. S. Air Force Titan 34D explosion Apr. 18 at Vandenberg AFB intensifies an already critical U. S. space launch crisis crippling strategic reconnaissance, missile warning and other military satellite operations.

Accident investigators are sure one of the vehicle's two solid rocket boosters exploded, but are trying to determine whether the explosion was caused by a booster defect or an external factor, such as an unplanned activation of the destruct package on the solid rocket that exploded.

The Titan was carrying a USAF/Lockheed Big Bird reconnaissance satellite, which returns its information using film pods. This is in contrast with the Central Intelligence Agency KH-11 type satellite, which was not on the Titan that failed. The KH-11 is a much different spacecraft, which also can be launched on Titan but returns its imagery by digital radio transmission to antennas at Ft. Belvoir, Va.

As the Titan reached about 700 ft. altitude about 8.5 sec. after liftoff, Vandenberg tracking cameras show that a 12-ft. ball of fire erupted from the side of one of the vehicle's two solid rocket boosters. The tracking cameras were photographing the Titan every 0.2 sec. and the plume developed within a 0.2-sec. period. The fireball was followed instantly by the explosion of the entire 1.4-million-lb.-thrust solid rocket booster, investigators told AVIATION WEEK & SPACE TECHNOLOGY.



Big Bird reconnaissance satellite like that lost Apr. 18 in the Titan 34D explosion has a cylindrical camera section. Reconnaissance pictures are returned to Earth in parachute equipped reentry vehicles that are retrieved in midair over the Pacific Ocean by Air Force Lockheed C-130 aircraft. The spacecraft destroyed Apr. 18 is significantly different from the KH-11 type satellite, which uses digital radio transmissions to return images but is also launched by the Titan.

As the single solid booster exploded, the range safety system on the rest of the Titan sensed the catastrophic malfunction. Within milliseconds, the safety system automatically fired destruct packages on the other solid booster and the Titan central core vehicle to prevent these stages from flying out of the launch area.

Air Force and contractor countdown crews in the launch control center blockhouse adjacent to the Space Launch Complex-4 pad were shaken as the debris from the 1.4-million-lb. vehicle crashed on the pad and surrounding area.

The Titan 34D launch pad was significantly damaged and will require an estimated five months to repair. A second nearby launch pad used for smaller Titan 3B vehicles sustained less shrapnel type damage.

Launch photography shows that whatever caused the United Technologies Chemical Systems Div. motor to explode probably did not result from a leak in a booster segment seal as occurred with the space shuttle solid booster, although this remains under review. Investigators believe a failure in the solid booster itself is a likely cause, but also are considering the potential effect of outside factors. In the late 1960s a Chemical Systems Div. Titan solid booster being ground tested exploded due to problems traced to the insulation surrounding the solid propellant, investigators said. The possibility that a similar failure occurred in the Apr. 18 accident is being assessed, as is the possibility that propellant grain and motor case problems were involved.

Accidental detonation of the range safety destruct package on the solid booster due to electrical or other problems on the stage also is being examined, as is the possibility of a failure in the liquid-fueled core vehicle that could have affected the solid booster's destruct package. This scenario is viewed as unlikely, however.

The Titan solid rocket booster program is expected to require 6-12 months to recover from the accident. The shuttle is not expected to return to flight status until mid-1987 at the earliest. Titan launches of critical defense spacecraft prior to fully understanding what caused the Apr. 18 accident would be ordered, if necessary, in a national military emergency.

Flight experience with space shuttle solid rocket booster seals began to raise con-

Continued

cerns in mid-1985 about the adequacy of seals in the Chemical System Div. boosters used on the Titan, as reported by AVIATION WEEK & SPACE TECHNOLOGY last month (AW&ST Mar. 17, p. 22). The company responded to those concerns by recommending a doubling of the seal protection on future versions of the booster—a move Titan's prime contractor, Martin Marietta, initially rejected. The manner in which the stage exploded, however, is leading away from the seals as the cause, Titan accident investigators said.

Air Force/Lockheed SR-71 and U-2 reconnaissance aircraft operations will be expanded to obtain global military photo intelligence over low-air-defense threat areas to help conserve the capability of the single KH-11 reconnaissance satellite remaining in space. The Titan lost Apr. 18 and an earlier Titan failure Aug. 18, 1985, both carried imaging reconnaissance satellite payloads that were intended to supplement the single operational vehicle.

Reconnaissance Problem

Inability to supplement the KH-11 in orbit is a serious strategic reconnaissance problem since that satellite, launched Dec. 4, 1984, is about halfway through its 3-4-year expected lifetime. The U. S. normally maintains at least two strategic reconnaissance spacecraft in orbit at a time.

The launcher that exploded was carrying the last of the Big Bird spacecraft, which is significantly different from a KH-11.

A more advanced digital imaging satellite series based on the KH-11 was to begin missions from Vandenberg in 1987 on the shuttle. That new spacecraft—with modifications—can be launched by either the Titan or the space shuttle.

The problem, therefore, is not a lack of reconnaissance spacecraft to launch, but serious failures in both the space shuttle and Titan—halting launches of all large military spacecraft from both Vandenberg and Cape Canaveral.

In addition to the reconnaissance satellites to be launched from Vandenberg, Air Force/TRW ballistic missile early warning spacecraft that will be launched into geosynchronous orbit from Cape Canaveral will remain grounded until the cause of the Titan booster failure can be corrected. The missile warning spacecraft detect Soviet missile launch exhaust plumes but do not return imagery of the ground as do the Big Bird and KH-11 spacecraft.

Loss of both Titan and shuttle launch capability for the foreseeable future will slow Cape Canaveral launch of missile warning satellites with substantially improved capabilities. These improvements include uprated warning spacecraft equipped with dual wavelength capabilities in the satellite's 12-ft. infrared telescope to prevent jamming by Soviet ground-based lasers. The spacecraft also have a satellite-to-satellite cross link communications capability to thwart Soviet radio jamming, and will carry a more powerful computer.

Delivery of the first of these new spacecraft to Cape Canaveral is scheduled soon, keyed to a launch that was to have taken place on the space shuttle in 1987. The improved missile warning satellite design also is designed to be compatible with the planned new Titan 34D-7 version of the vehicle that exploded at Vandenberg.

The missile early warning satellites built by TRW are just as critical to monitoring Soviet capabilities as reconnaissance satellites, and more critical from the standpoint of providing the earliest possible alert against Soviet missile attack.

One or two missile early warning spacecraft routinely are launched from Cape Canaveral by Titan 34D boosters every year. In 1984, as many as three were launched from the Cape.

No missile early warning spacecraft were launched in 1985, however, and the inability to launch any more until the Titan and shuttle problems are resolved will prevent the U. S. from replacing any degraded missile warning satellites in space for the foreseeable future.

Recent Launches

The General Electric Defense Satellite Communications System (DSCS-3) and electronic intelligence satellite programs are expected to be less affected because such spacecraft have been launched from Cape Canaveral by the space shuttle within the last 18 months. The ability to replenish any DSCS or electronic intelligence spacecraft that fail in orbit will be directly dependent on the return of the Titan and shuttle to launch operations, however.

About 20 Big Bird film reconnaissance spacecraft have been launched by Titan boosters from Vandenberg since 1971 and about 6 KH-11 spacecraft have been launched from Vandenberg since 1976.

The Big Bird satellite has some advantages because its film reconnaissance product can sometimes provide higher resolution than the KH-11's image transmission technique. The KH-11 however,

Titan Coverage

Explosion of the Titan 34D satellite launch vehicle on its pad at Vandenberg AFB, Calif., was covered by these AVIATION WEEK & SPACE TECHNOLOGY editors: Bruce A. Smith, bureau chief, and engineering editor Michael A. Dornheim, in Los Angeles; Craig Covault, senior editor space technology, Theresa M. Foley, space technology editor, and Paul Mann, senior congressional editor, in Washington, and Edward H. Kolcum, senior editor Southeast U. S., at Kennedy Space Center. Copy and picture flow was directed by David Quast, assistant managing editor-production.

Flaming debris was thrown hundreds of feet by the solid rocket booster that exploded and the second booster, which was automatically destroyed by a safety destruct package. Note the space shuttle facilities in the right foreground, located about 3 mi. from the Titan pad.

Continued

is classed as a strategic response satellite with great maneuvering capability to enable it to overfly critical targets without relying entirely on orbital mechanics. Since it does not use film as a consumable, it has a much longer and more flexible useful life compared with the Big Bird satellites being phased out. The KH-11 also can relay its digital images to ground stations through Air Force/Hughes Satellite Data System relay spacecraft.

The Titan 3B, which uses the core Titan vehicle but not the solid rocket boosters, has been used since 1970 to launch a third type of imaging reconnaissance satellite that also is being phased out after 29 missions. Satellites launched by Titan 3Bs are smaller and shorter lived, but can dip as low as 70 mi. altitude to provide extremely high-resolution images of ground targets. Only one Titan 3B booster remains in the Air Force inventory and its launch pad is being modified for Titan-2 launches. That pad, too, must be repaired because of damage from the Apr. 18 explosion.

The Titan 34D that exploded uses only the solid rocket boosters mounted on either side of the core vehicle during liftoff to provide 2.8 million lb. of thrust. The core vehicle's two liquid-fueled Aerojet engines, generating 531,000 lb. of thrust, are not ignited until about 2 min. into the flight when the vehicle is 150,000 ft. high.

The solids are then separated and the core's first stage propels the vehicle until 273 sec. into the mission. At this point, the first stage separates and the single engine on the second stage completes injection of the reconnaissance satellite into polar orbit 500 sec. after liftoff.

Booster Size

The solid rocket booster that exploded is 120-in.-dia. and 90 ft. long. It is made up of 5½ propellant casting segments. Each motor weighs over 542,000 lb.

Each booster consists of a forward closure, an aft closure and interchangeable segments. Nitrogen tetroxide is carried in a large tank on the right booster with plumbing to route this fluid into each booster's nozzle for thrust vector control. The vehicle is guided by commands sent from a ground guidance computer.

The steel motor case segments are held together in a pin and clevis joint by 240 cylindrical pins. A single O-ring seal is used in each joint and the seal is seated in its functional location during joint buildup, in contrast with the Morton Thiokol shuttle booster design in which dual seals are supposed to be seated by pressure buildup in the motor.

At Vandenberg, the solid booster segments for Titan 34D vehicles are stacked on the launch pad, and the handling of that hardware during the stacking process will be examined much like is being done in the shuttle investigation. □

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Spy Satellite System Is Said 'Not in Crisis'

By Walter Pincus
Washington Post Staff Writer

U.S. photo-intelligence capabilities from space have been "stretched" because of last Friday's explosion of a Titan 34D booster rocket but are "not in crisis," according to a former Defense Department official familiar with such top-secret reconnaissance.

Some nongovernment experts on space programs have said that only one U.S. photo-intelligence satellite is in orbit, a KH11, and that the last of that model was destroyed in the Titan explosion.

They have also said there is no immediate prospect of launching a new photo-intelligence satellite because the KH11's larger successor, the KH12, can only be boosted into space by the shuttle.

Other sources with direct knowledge of the highly classified program take issue with that analysis. Avoiding mention of numbers and types, they suggest that the United States has more photo-intelligence capability from space than a lone KH11.

There are "adequate resources to cover our needs" and more "assets" in space capable of providing visual and other intelligence data than experts outside government realize, the former Pentagon official said.

Another soruce said of the Titan explosion, "It was not a KH11," adding that what was atop the Titan 34D was associated with a "black [intelligence] program."

The major problem created by the second Titan 34D failure in seven months and the Jan. 28 shuttle disaster, he and other sources said, is not loss of two intelligence-gathering satellites but of ways to launch other important, larger satellites.

These include new-generation DSP early-warning satellites, sophisticated Magnum electronic intercept satellites, new KH-12 photo-reconnaissance satellites, SDS information-relay satellites and jam-proof DSCS III high-frequency communications satellites.

"If the number of geopolitical problem areas grow," a former Pentagon official said, "we could run out of capability . . . . But as of now we have adequate resources . . . ."

The sophisticated $800 million KH11 has been the backbone of the space-intelligence system for 10 years. Able to circle the globe in 90 minutes, it can be directed to take pictures almost anywhere on Earth from 150 miles in space and return them immediately.

Last August, a KH11 was destroyed when a Titan 34D failed after launch. At that time, the United States had available what one official called "ample" photo satellites. Because of security, the nongovernment experts said they are not certain how many KH11s were built or orbited and how long they remain operational.

The first KH12 was built specifically to be orbited by the shuttle, which can carry a greater payload than the Titan 34D. But, according to revised shuttle projections, will not be launched until July 1987 at the earliest, Pentagon sources said.

Also waiting to go into orbit aboard a Titan 34D, one source said, is the DSP (defense support program) satellite, which has been ready for several months at Cape Canaveral. Probes into the Titan crashes have delayed its launch.

The DSP would be pushed into stationary orbit far above the Soviet Union where it would be the first device to "see" with infrared detectors signs of a Soviet missile launch.

Three older DSP satellites are in operation and two earlier ones remain in orbit as backups, one source said. Such redundancy offers an indication of the extra capability built into the space-defense program.

The newest DSP, unlike the older ones, can counter Soviet attempts to hide space launches and transmit data in a manner that cannot be jammed, sources said.

Reports on Secret Rocket Payload Called Wrong

WASHINGTON, April 25 (AP) — A respected trade publication is contradicting widespread reports that the Titan rocket that exploded last week was carrying an advanced spy satellite, the KH-11.

The magazine, Aviation Week and Space Technology, reports in its issue of April 28 that the rocket was instead carrying an Air Force reconnaissance satellite that returns its information by dropping off film pods that are then retrieved by airplanes.

The KH-11, by contrast, sends its information by radio to Fort Belvoir, Va. The Central Intelligence Agency analyzes the data.

The Titan climbed 700 feet above Vandenberg Air Force Base, Calif., in its 8.5 seconds of flight April 18. Tracking cameras show a 12-foot ball of fire erupted from the side of one booster rocket before the entire assembly exploded, the magazine said.

Question About Cause

The Titan rockets are armed with explosives so they can be destroyed in the air if they veer within range of populated areas. Investigators are trying to determine whether the explosion was caused by a defect in the rocket or whether the explosives went off accidentally, the magazine said.

Most experts say the destruction of the space shuttle Challenger and its crew of seven on Jan. 28 was caused by a leak between segments of the right booster rocket, and such a leak was immediately suspected in the Titan, which uses similar joints.

The magazine said such a leak "probably" did not cause the explosion, "although this remains under review."

The Titan's solid-fuel booster rockets are built by United Technologies Chemical Systems Division, while the space shuttle's are built by Morton Thiokol Inc.

Aviation Week said the Titan booster program would take 6 to 12 months to recover from the April 18 accident and a similar one last August. The space shuttle is expected to be grounded 12 to 18 months for modifications to its booster rockets.

An improved version of the KH-11, the KH-12, was to have been launched from Vandenberg next year. The improvement mainly adds the capability to launch the satellite from either a Titan rocket or from the space shuttle. Only one KH-11 satellite is now in orbit, experts outside the Government say.

The magazine said the satellite destroyed in the explosion, dubbed Big Bird, was the last of the series. It said the United States would increase its reconnaissance capability by expanding flights of the SR-71 and U-2 spy planes.

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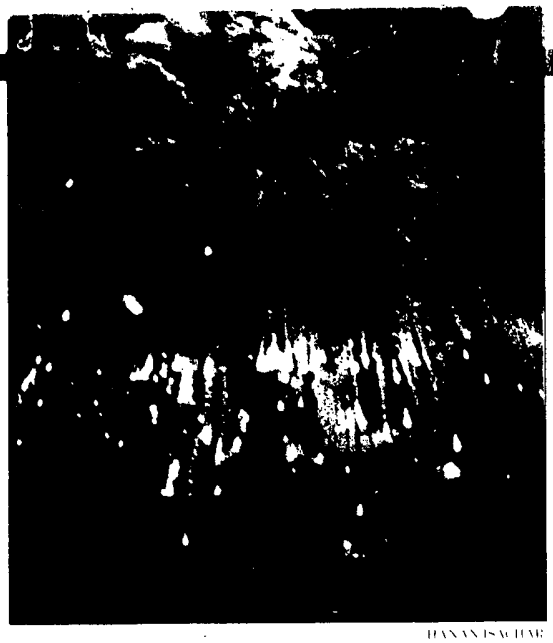
ered by his middle-class neighbors. Six years ago neighbor John Favara accidentally killed Gotti's 12-year-old son when the boy rode his bike into the path of his car. Soon after, witnesses said, Favara disappeared. Speculation is that he was buzzsawed in half before he was stuffed into a car about to be power compacted, which Gotti denies. Meanwhile, he visits his son's grave almost daily.

The Gotti legend apparently went into action as the current trial began. A key prosecution witness reported that a black Mercedes like Gotti's sidled up to him on the highway and two men called out, "We want to talk to you about the Gelb homicide," one of the murders mentioned in the indictment. Meanwhile, William Battista, a Gotti associate turned informer, fled when his name was leaked to the defense. And Gotti codefendant Armond Dellacroce, who had pleaded guilty to one racketeering count, vanished before his April 1 sentencing.

Material witness: The disappearances sent prosecutor Diane Giacalone scurrying for a court order to seal the list of the more than 100 government witnesses from defense attorneys. U.S. district judge Eugene Nickerson granted the request, but stern warnings from the bench may not be enough. Last month Romual Piecyk, a 37-year-old mechanic who had told police that Gotti roughed him up in a dispute over a parking space, suddenly lost his memory. "The media printed that he was next in line for godfather," Piecyk wrote the Queens district attorney. "Naturally, my idea for pursuing this dropped." When the D.A. persisted, Piecyk checked himself into a hospital for elective surgery. Yanked out of bed and held as a material witness, Piecyk claimed he didn't recognize his attackers in the courtroom. Beaming, Gotti walked free.

Gotti may not walk away this time. But even if he does, law-enforcement officials say his control of the Gambino family may be waning. Last week's bombing may have been the first salvo in a gathering mob war; at minimum, it was a powerful mark of disrespect. "I don't see anything good for him," said Ronald Goldstock, director of the New York State Organized Crime Task Force. "Odds are that he will be convicted or reindicted or subject to his own internal warfare." In the end, his staying power may depend not so much on the fear he engenders but on whether a tough guy like John Gotti is the man to carry the Mafia into the 21st century. The feds are tougher than ever. Business is good, and hidden management of legitimate enterprises may yield more and safer profits than the old strong-armed ways. Big Paul Castellano could have the last laugh after all.

With reporting by Martin Kasindorf in New York



HANNAN/SYGMA

'We thought of an A-bomb': *Titan explosion*

A Space Spy Gap

The Titan explosion

Living in the shadow of sprawling Vandenberg Air Force Base, residents of Lompoc, Calif., have become inured to rocket launches. Few were looking skyward last Friday morning when a giant Titan 34D rocket on a classified military mission exploded just five seconds after liftoff. "I heard a banging, but it wasn't really loud," said Alice DeArmas, who was working behind the counter at a nearby Jiffy-Mart. "Then we saw the cloud—white and orange on the bottom. The first thing we thought of was the A-bomb." It was the second failure of the rocket in as many launches: last August another Titan 34D, carrying a vital KH-11 spy satellite, was destroyed by ground controllers four minutes after liftoff because of massive problems with its liquid-fuel system. After the latest failure, the Air Force grounded its remaining six Titan 34D's until the causes of the launch failures could be identified. "That could take months and months," said Air Force spokesman Maj. Ron Rand.

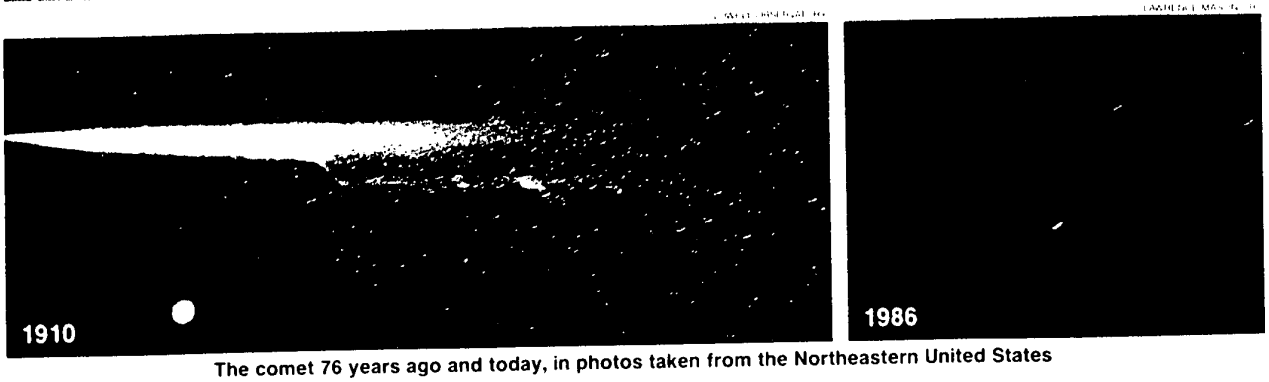
The grounding of the Titan fleet, coupled with the Challenger tragedy, meant that America suddenly lacked the heavy-lift capacity to put large satellites safely into orbit. Intelligence sources described the latest space setback as a national security disaster—one that could within a year leave the United States without any spy satellites to monitor Soviet military preparedness. According to some sources, the latest ill-fated Titan rocket was carrying the last of the KH-11 reconnaissance satellites. Another KH-11 is currently in polar orbit monitoring Soviet military activity, but under normal conditions its fuel for maneuvers will be exhausted by early next year, though experts say its life expectancy might be extended through 1987. But the Air Force had planned to have two KH-11s in orbit simultaneously. "We need them to keep track of what the Soviets are up to," said Michael Krepon, an arms-control expert at the Carnegie Endowment for International Peace. "Even when we have a full complement up there, there aren't enough to do everything that we want them to do."

Tight security means that it is far from certain that the last KH-11 was aboard the Titan. Some sources said that the payload was the Pentagon's latest global communications satellite. Even so, that would not significantly lessen the problem. The Air Force might still have its last KH-11, but no secure way to put it or any other critical military satellite into orbit.

Desperation ploy: Why is the United States down to just one aging eye in the sky to monitor the Soviet military buildup? The dilemma stems from NASA's insistence that the space shuttle would be used for all future satellite launches. The KH-11s were scheduled to begin to be replaced this year by the Air Force's far more sophisticated and heavier KH-12 satellites. But the Challenger explosion changed all that, since the Titan lacks the power to put a KH-12 into orbit. Last week's abortive Titan launch may have been a desperation ploy: the remaining KH-11 was an engineering test model retrofitted to replace the spy satellite destroyed last August.

The sudden spy-satellite shortage has led to speculation that the space shuttle might be prematurely forced back into service to meet the military's surveillance needs. But even in the best of circumstances, launching the KH-12 would be tricky. Such a launch would require unproven lighter filament-wound booster casings and throttle settings higher than the shuttle has ever used before. It would have been a high-risk operation at best—even before the Challenger tragedy. Now the United States may have to weigh the human risks of rushing the shuttle back into service against the national security dangers of losing a sky window on the Soviet Union.

Walter Shapiro with John Barry in Washington and Peter McAleer in Lompoc



The comet 76 years ago and today, in photos taken from the Northeastern United States

FAREWELL TO HALLEY'S

The comet that left us comatose

■ By mid-April, the reviews were in: Halley's comet, once billed as the astronomical show of a lifetime, was a bust.

Though scientists no doubt learned much from the latest visit of the celestial nomad, most observers were disappointed. "Just a dull, smudgy, little old anticlimax," complained one.

The biggest letdown came for those who coughed up sky-high sums to travel cosmic distances to the Southern Hemisphere, where viewing was supposed to be best. "I came 4,000 miles to see this crummy little fuzzball?" wailed a woman on a mountaintop in Peru.

The problem, scientists said, was unrealistic expectations. People anticipated a repeat of the 1910 visit, when Halley's came so close, within 14 million miles, that Earth actually passed through its tail. This time, the comet got no nearer than 39 million miles. All the Earthbound could see was a faint spot—not the huge ball of light and long tail captured by old photos. In fact, Halley's put on the dullest show of its 30 recorded visits since 240 B.C.

If the comet didn't exactly light up the sky, it did ring some bells. Telescope and binocular sales for Tasco hit $70 million in 1985, up $19 million over the previous year.

Among the most enterprising comet sellers were firms that licensed logos for the natural phenomenon. Owen Ryan & Associates of New York expects to make $1 million from licensing 22 firms to sell such items as Halley's auto tags, meal kits from a fast-food chain and pajamas.

The company's other enterprises: A comet magazine that sold nearly 1 million copies at $3 each and, for $350, a packet of 80 comet stamps.

Travel agents did well as avid comet watchers paid $3,000 to $4,000 for tours to Australia, Africa, South America and the South Pacific. But there were cancellations as it became obvious the comet was a fizzle. Alan MacRobert of *Sky and Telescope* magazine insisted the problem was not in the stars but in ourselves. Color photos, movies, TV and other modern gadgets have sated people's visual senses.

Though it will be the end of April before Halley's disappears for another 76 years, MacRobert's advice to all but dedicated amateur astronomers was: "If you're looking for visual thrills, stay in and watch beer commercials on TV." ■

by Steve Huntley and Jeannye Thornton

TITAN DISASTER

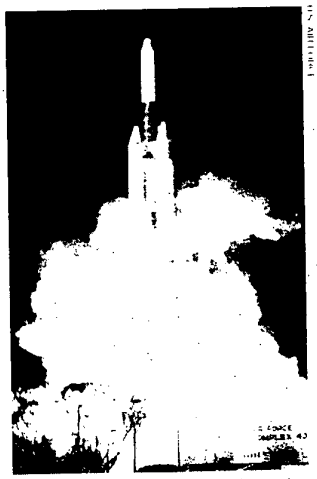
Uncle Sam still blind in one eye

■ A stunning launch-pad explosion of America's most powerful unmanned rocket, possibly carrying a top-secret spy satellite, may leave U.S. photo reconnaissance crippled at a time when world tension is running high.

Only 3 seconds after the April 18 liftoff of the Titan 34D from Vandenberg Air Force Base in California, the rocket erupted in a massive fireball. The liquid-propelled Titan uses the same type of solid-fuel booster rockets as did the space shuttles.

Air Force officials would not confirm that a photo-intelligence satellite was aboard the Titan. But outside experts said such a craft has been urgently readied for launch this spring to replace one lost in the last Titan blastoff, in August, which also ended in disaster.

If another KH-11 photo-reconnaissance satellite indeed was destroyed on April 18, the United States will remain half blind for at least one more year in its ability to monitor Soviet military bases and such hot spots as the Persian Gulf and Libya.



Successful 1982 Titan launch

Normally, two such birds careen through the heavens, dividing the globe between them. Since August, however, when one of the satellites went dead, one has had to do the work of two. The result: American analysts can watch only half the planet's surface at a time. In 1979, a gap in satellite coverage of the Soviet Union played a role in Senate rejection of the SALT II Treaty.

"We're in a very precarious position concerning our intelligence and treaty-monitoring capabilities," said Jeffrey Richelson, arms-control-verification specialist at American University in Washington, D.C., adding: "With only one satellite operating, you forfeit some important military intelligence."

The Titan failure also was worrisome because of the loss of the shuttle Challenger in January, as well as being the second launch accident in a row for the Titan. Intelligence sources said the destruction of the rocket and its payload last August 28 added up to $150 million. That was the first Titan failure in 18 years of launches from Vandenberg.

The new Titan mishap, on the heels of the grounding of the shuttle fleet, may have left America without a highway into space for the biggest and most-important military payloads. ■

NEWSWEEK
5 May 1986

A Hurried Return for the Shuttle?

It may be needed soon to launch a spy satellite

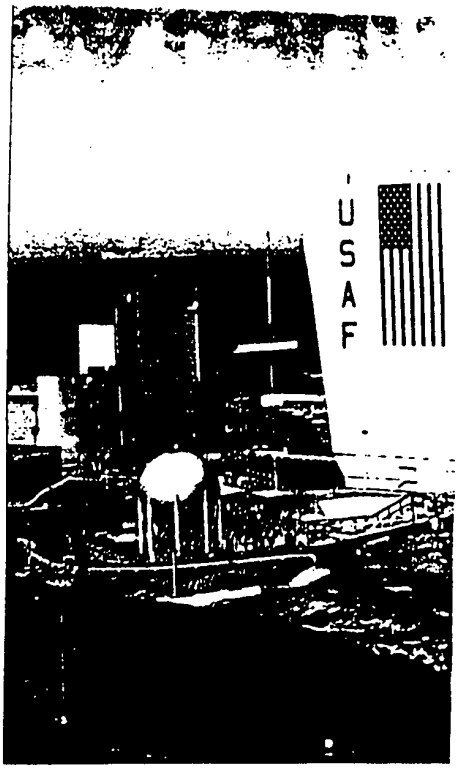
The mathematics of national security were worrisome enough following last January's destruction of the space shuttle Challenger: according to the Pentagon, a year's grounding of the shuttle fleet would postpone the launching of about 10 "critical national-security payloads"—satellites used for photographic reconnaissance and other military missions. But that figure assumed continued operation of the Air Force's unmanned Titan launchers, a supposition that went up in a cloud of white and orange smoke on April 18, when a Titan 34D exploded just seconds after liftoff from Vandenberg Air Force Base in California. Now, says one Pentagon source, "we just flat don't have any heavy payload launch capability."

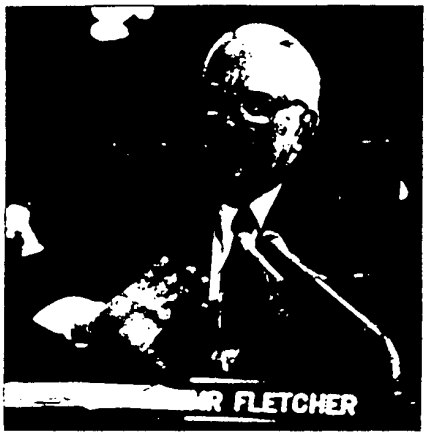
For the moment, the military is more concerned than worried. But with the backlog of "critical payloads" growing, the Pentagon may soon need the launch capacity badly enough to require use of a shuttle prematurely. "This is the biggest mess the American space program has been in since the beginning," says space expert John Pike of the Federation of American Scientists. "As of [the day the Titan exploded], the space progam is shut down."

Demoralized agency: Pressure for a premature launch was the last thing NASA needed. Last week, just as confirmation hearings for James Fletcher as NASA administrator were getting under way, The New York Times ran a detailed two-part series describing government auditors' reports of poor management, fraud and incompetence within the agency, causing the waste of at least $3.5 billion since the start of the shuttle program in 1971. Fletcher, who had been NASA's chief when some of the alleged mismanagement occurred, described the charges as cumulatively misleading. While the articles led some senators to question Fletcher's suitability for the job, they nonetheless seemed unwilling to leave the demoralized agency leaderless in the Challenger aftermath.

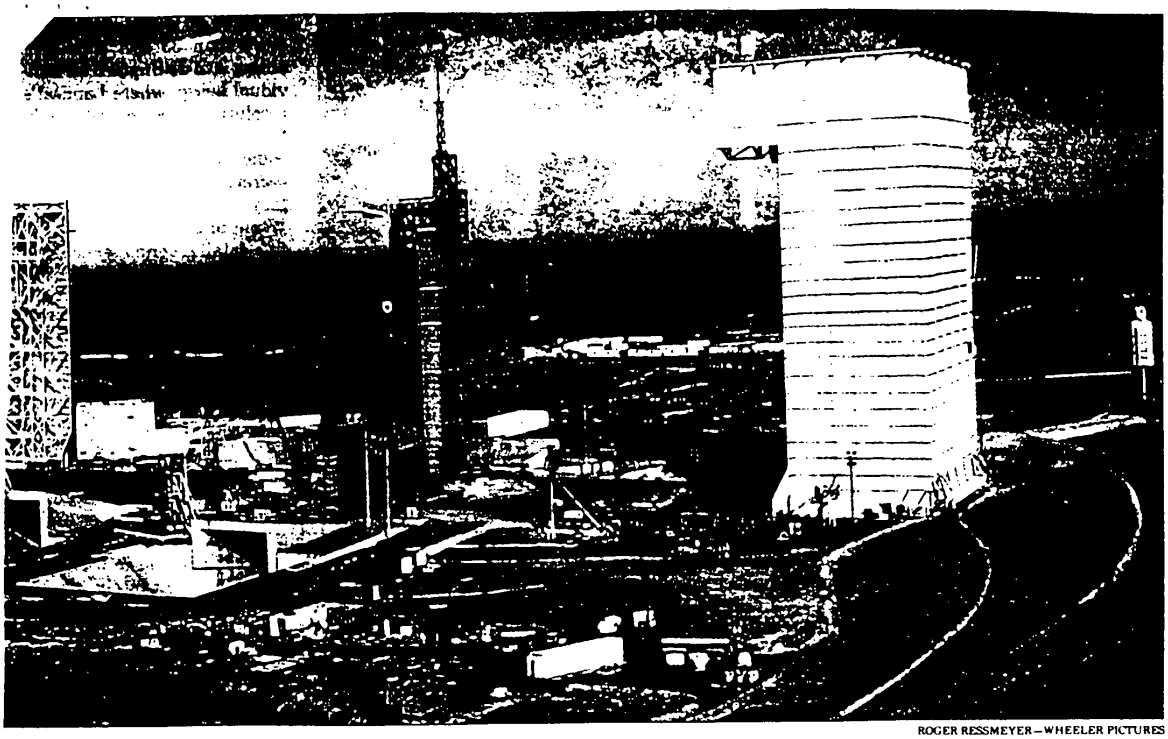
The Air Force has managed to keep the doomed Titan's payload a secret, but many outside experts are convinced it was a KH-11 photo-reconnaissance satellite. If so, it was the last one in the U.S. inventory (another blew up with an errant Titan in August). **The lone KH-11 now in orbit, monitoring Soviet military activities and arms-control compliance, will likely run out of fuel sometime next year, although NASA hopes that conservation measures can keep it aloft until 1988. Its next-generation replacement, the 32,000-pound KH-12, is too heavy to fly on a Titan and is designed to be reserviced in orbit. Only a shuttle can carry it. "Right now the situation is not catastrophic," said a Pentagon source.** However, the Air Force and NASA are cutting things very close: the space agency does not expect to be fully satisfied with the shuttle's safety until 1988. If the best-case timetable goes awry, the United States would either have to rush a shuttle launch and risk another tragedy and the loss of a $1 billion KH-12 or face the prospect of having no orbital eye on the Soviets.

American security overall is not at risk. At any one time, says Paul Stares of the Brookings Institution, the United States has 45 to 50 military or national-security satellites in orbit. But they do different jobs, such as communications, ocean surveillance and nuclear detection. Until a





'The biggest mess': *A launch of Discovery, Fletcher at confirmation hearing*



ROGER RESSMEYER—WHEELER PICTURES

Preparing for polar orbit: *Vandenberg Air Force Base in California, the new shuttle port, enables a launch over water*

KH-12 can be launched, the KH-11 is the United States' sole photo-reconnaissance satellite, and its loss would be only partially covered by a planned increase in the use of the high-altitude SR-71 "spy" plane.

Although a KH-12 is rumored to be flight ready, the shuttle is far from it. Redesigning and testing the solid rocket boosters that appear to be the cause of the Challenger explosion will take at least a year. James Kingsbury, head of the booster joint redesign team at NASA's Marshall Space Flight center, is contemplating several changes in the four-segment rocket: a rubber-band-like seal to protect the joints between the segments from wind and water; a heating element to keep the "O-rings" inside from becoming too stiff to seal the joints in cold weather, and interlocking edges to stop rotational forces that warp the joints and tend momentarily to unseat the O-rings.

Maximum coverage: Even before the January disaster, NASA faced delays in preparing a shuttle to loft a KH-12. For maximum coverage, spy satellites must fly in a north-south polar orbit, perpendicular to the earth's rotation. Thus with each orbit they pass over a different swath of land. But polar orbits require far greater thrust than the shuttle's normal east-west equatorial orbit, in which the earth's rotation imparts a 900-mph boost. Without this kick, north-south launches require lighter booster rockets, made of filament-wound casings instead of heavy steel. But the new casings have already failed several recent tests.

Under current conditions, a KH-12 launch would violate NASA associate administrator Richard Truly's criteria for returning the shuttle to work. Among other things, he stipulated that the first launch be from Florida and that the main engine be throttled no higher than 105 percent of standard thrust. But any polar-orbit shuttle must lift off from Vandenberg: U.S. policy prohibits a launch over land for safety reasons, and Cape Canaveral has population centers to the north and south. Vandenberg launches are southward over water, but to reach polar orbit, the main engine must be pushed up to 109 percent of thrust—the maximum.

Despite the arguments against a Vandenberg launch anytime soon, many workers believe that a shuttle liftoff will come sooner than the September 1987 date announced after the Challenger disaster. Vandenberg workers are now making modifications to Space Launch Complex 6 on a narrow plain between the Santa Ynez Mountains and the bluffs overlooking the Pacific. Known as "Slick-6," the pad can handle at least four shuttle launches a year.

Given the vastness of Vandenberg's 100,000 acres, security fears have arisen: destruction of a launch-ready shuttle would take little more than shots from a well-aimed rifle. And getting on the base is as easy as buying a train ticket from L.A. to San Francisco: an Amtrak line crosses Vandenberg within eyeshot of Slick-6. But the Air Force hints that the base is well covered by electronic surveillance, and security has been tightened since the Libya bombing. Still, space officials in Washington worry about sabotage from within the work force. "It is much too easy to leave a bolt untightened or a wire disconnected," said one source.

How soon Slick-6 will be needed depends on how badly the Titan explosion impaired U.S. ability to monitor Soviet activities, and that depends on whether the rocket was indeed carrying the last available KH-11 or on how long it will take to ready another Titan for launch. If the existing KH-11 lasts until 1988, the Pentagon may be able to scrape by with its current satellite armada until the shuttle can safely fly again. Otherwise, if the craft is forced to the launch pad too early and another orbiter is by chance destroyed, says a space expert, it "would stretch a 2-year loss into a 10-year loss."

SHARON BEGLEY *with* MARY HAGER *and* JOHN BARRY *in Washington and* PETER MCALEVEY *at Vandenberg*

A26 21 MAY 1986

AIR FORCE STUDIES DELAYING SHUTTLE

Pentagon May Wait Until 1991 for First Launching of Craft From California Base

By JOHN H. CUSHMAN Jr.
Special to The New York Times

WASHINGTON, May 20 — The Air Force is seriously considering delaying the first space shuttle launching from a new West Coast facility until 1991, when a replacement for the shuttle Challenger might become available, Pentagon officials said today.

Until the Challenger was destroyed just after liftoff from Cape Canaveral, Fla., in January, the first launching from the new facility at Vandenberg Air Force Base, Calif., had been scheduled to take place in July.

The Government is considering major changes in the way military, scientific and commercial satellites are launched in the wake of the Challenger's destruction, which killed the crew of seven and forced the grounding of the three remaining shuttles for at least 18 months.

Putting Site in Mothballs

Delaying the maiden voyage of a space shuttle from Vandenberg would mean putting the facility, built at a cost of $2.8 billion over the past seven years, into standby status. This would temporarily crimp the nation's ability to put military payloads into polar orbits, a job normally done from the West Coast.

The officials, who are deeply involved in military space programs, said no consideration was being given to closing the Vandenberg shuttle complex permanently.

Maj. Ron Rand, an Air Force spokesman, said the military had not made a final decision on Vandenberg. He said the Air Force "reopened the issue" when the National Aeronautics and Space Administration disclosed recently that the remaining three space shuttle orbiters would be grounded until next summer and that flights would then resume on a much more conservative schedule than previously planned.

An official said today that these new estimates of the remaining shuttles' flight schedules had led the military to doubt whether flying some missions from Vandenberg "is the best thing to do with the taxpayers' money."

Balancing Cost and Security

The officials stressed that the decision on the Vandenberg facility, Space Launch Complex Six, is exceedingly complicated. Issues of cost and schedules must be balanced against national security considerations, they said.

Many military satellites are launched from Vandenberg because they are destined for polar orbits, which allow them to pass over all parts of the globe for such purposes as reconnaissance.

The Air Force's policy is not to discuss these classified satellites. In interviews today, officials said only that the Air Force requires periodic launchings of satellites into polar orbits.

The motion of the earth makes it more difficult to launch polar orbiting satellites from Florida, and doing so with a space shuttle might require the orbiter to fly over populated areas, such as New York City.

Possible Delays Cited

If the Air Force temporarily boards up the space shuttle launching facility in California, it probably would delay launching certain highly classified satellites into polar orbits until a new variety of heavy-duty rocket becomes available, perhaps in 1990. Other shuttle payloads, though, could be launched from Florida.

The first shuttle payload now scheduled to take off from Vandenberg is an experimental satellite, Teal Ruby, that carries infrared sensors to spot and track aircraft and cruise missiles. This satellite is not polar orbiting and could be launched from the Florida site.

The officials said that even if the Air Force elected to press for the earliest possible shuttle launching from Vandenberg, the delays stemming from the Challenger's destruction, along with other considerations, would delay the flight until 1988.

The military is considering two approaches to a possible further delay, they said.

Aiming for Space Station

The worst case, they said, would be to put the facility into "caretaker status" until it is needed for missions relating to the planned construction of a manned space station some time in the mid-1990's. It would take three years to bring the launching site into operation once the need became apparent, they said.

A less drastic option would be to shutter the facility until a fourth space shuttle is built to replace the Challenger. This is likely to take until 1990 at the earliest.

Even if West Coast flights are postponed, the officials said, the Air Force will continue to prepare the launching site for service as quickly as possible. As part of that effort the space shuttle Columbia will be taken to Vandenberg this summer for tests of the facilities.

$400 Million a Year

The Air Force estimates the annual cost of operating the Vandenberg shuttle facilities at $400 million. Some of this money still would be spent just to keep the facilities in shape.

The real advantage of putting Vandenberg into mothballs, they said, is that it allows NASA and the Defense Department to increase the number of launchings each year while a fourth shuttle is built.

It is time-consuming to switch a shuttle back and forth between the Florida and California launching sites, and the result would be a loss of "two or more missions per year," an official said.

But while the military is eager to fly the remaining shuttles as often as possible once flights resume, it does not want to lose the ability to launch some of its most important satellites into orbits over the earth's poles.

C26

A Quick Decision at Justice

JAMES COLBURN—PHOTOREPORTERS

Deeper probe: *Deaver*

Even before the Justice Department announces the completion of its preliminary investigation into alleged ethics-law violations by former White House aide Michael Deaver, Reagan administration sources say a decision has been made at Justice to call for an independent counsel in the case. With Attorney General Edwin Meese III standing aside because of his long prior relationship with Deaver, the decision to request a special counsel is being made by Deputy Attorney General Lowell Jensen, according to sources close to the case. Given Deaver's close ties to Ronald Reagan, these sources say, the White House is "staying so far from the decision it isn't even funny."

Meanwhile, former White House counsel Fred Fielding has requested an informal meeting with the staff of a House subcommittee looking into the Deaver case. According to subcommittee sources, Fielding says he wants to "clarify" his role in the controversy—drafting a letter supporting Deaver a day after meeting an official of Deaver's firm to discuss a job there.

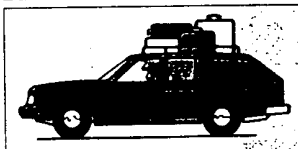
The House panel also has begun to consider expanding its investigation to include activities of the office of the U.S. Trade Representative. The subcommittee has received a number of complaints that the revolving door between the USTR and firms lobbying for foreign clients has made it all but impossible to keep U.S. trade strategy secret from those countries. Such an inquiry is likely to include the role of Deaver's firm in trade matters, committee sources say.

White House Trade Strategy

Though the Democrats are counting on trade as a key issue for their candidates in November, White House aides say they have new private polls showing that trade is not a major national concern. Accordingly, Reagan's men plan no high-profile presidential campaign against the protectionist trade bill pushed through the House by Democrats last week and likely to be taken up by the Senate later this session. White House strategists will limit the president's public involvement on the issue to one major speech later this month and occasional comments touting "free trade" at appropriate times and places—with the clear understanding that Reagan will veto protectionist legislation if it reaches his desk. Until then, with New York Times, Washington Post and Wall Street Journal editorials backing the White House position, "we'll let our distinguished allies carry the fight for us on this one," said one senior White House aide.

A Waldheim Protest

If Kurt Waldheim is elected president of Austria next month—and it is proved that he wronged the Jews or committed any war crimes during World War II—Israel will protest by not sending a new ambassador to Vienna during his term of office, according to Israeli officials. Ambassador Michael Elizur has already agreed informally to postpone his planned retirement this summer for six months, if necessary, so a new Israeli envoy would not have to present credentials to a newly elected Waldheim this summer. When Elizur finally does step down, the Israelis would leave their embassy to the present deputy chief of mission—or perhaps a new, but somewhat more senior, chargé d'affaires.

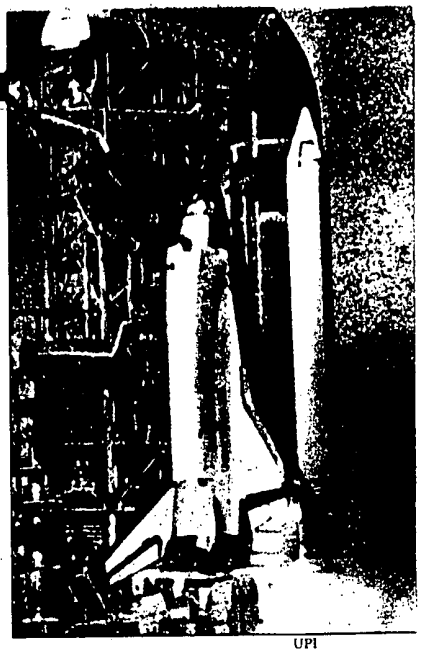


How Safe?

Recent statistics show that Americans who avoid foreign travel because of terrorism face greater risks at home.

- **25 killed overseas in terrorist attacks (1985)**
- **43,500 killed in automobile accidents in the United States (1985)**
- **1,384 murdered in New York City (1985)**
- **36 murdered in Honolulu (1985)**
- **150 died in their own bathtubs (1984)**
- **1,063 killed in boating accidents (1984)**
- **3,100 died choking on food (1984)**

SOURCES: U.S. STATE DEPARTMENT, DEPARTMENT OF TRANSPORTATION, FBI, NATIONAL SAFETY COUNCIL



UPI

Challenger: *New plans*

Spy Launch

The U.S. Air Force has a radical new plan to launch its next-generation spy satellite—the KH-12. Only one U.S. photo-reconnaissance satellite remains aloft, and it is expected to run out of fuel sometime next year. But the new military space complex at Vandenberg Air Force Base in California—the planned launch site for the KH-12—has run into delays that may make it unavailable for space-shuttle launches for two years. So the Air Force is planning to put the massive 32,000-pound KH-12 satellite into orbit next summer on one of the first rescheduled shuttle flights from Cape Canaveral since the Challenger disaster, though it would require some fancy flying and two trips.

To save weight and ease strain on the shuttle engines during liftoff, military sources say, the satellite would go up without a full load of fuel—just enough for precise placement in the north-south polar orbit required for Soviet surveillance. A second shuttle would carry the rest of the fuel. Normally, a polar launch from Canaveral would fly over heavily populated areas such as New York City, but the Air Force hopes to avoid that with a dog-leg course out over the ocean, then back northwest between Pittsburgh and Chicago.

LEVEL 1 - 26 OF 64 STORIES

April 18, 1986, Friday, AM cycle

SECTION: Domestic News

LENGTH: 653 words

HEADLINE: TITAN EXPLODES, SENDING UP GAS CLOUD

BYLINE: By Ronald Clarke

DATELINE: VANDENBERG AIR BASE, Calif.

KEYWORD: MISSILE

BODY:

... on the base, but far from the Titan site. Base officials believe the first space shuttle launch from Vandenberg, which covers 154 square miles of scrubland, will take place in the latter part of next year.

The Air Force also refused to identify the payload aboard on the booster that exploded over Vandenburg last August, but published reports at the time identified it as a KH-11 photo -intelligence spy satellite.

Pentagon officials, who asked not to be identified, expressed disappointment at today's explosion.

They said they did not know what effect it would have on military launches, which have been backed up by the suspension of the shuttle program caused by the Challenger disaster, which killed seven astronauts.

The Titan, built by the Martin Marietta Corp., is America's standard heavy-duty space workhorse booster and is used for both military and non- ...

LEVEL 1 - 22 OF 64 STORIES

The Associated Press

April 18, 1986, Friday, PM cycle

SECTION: Domestic News

LENGTH: 316 words

HEADLINE: Explosion Rocks Missile Base During Scheduled Launch

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Missile-Blast

BODY:

... saw a huge orange cloud in the sky.

Vandenberg, 130 miles northwest of Los Angeles, is where the Air Force tests new missiles such as the MX and periodically launches ballistic missiles already in service, such as the Minuteman III, to test their reliability.

Military and civilian satellites are also launched there.

Last Aug. 28, a Titan rocket blew up after launch from Vandenberg. The rocket had carried a KH-11 photographic reconaissance satellite, which was destroyed in the blast.

John Pike, a space analyst for the Federation of American Scientists in Washington, said earlier this year that he believed the August explosion left only one of the supersecret KH-11s in orbit, while the Pentagon prefers to have two passing over the Soviet Union.

LEVEL 1 - 21 OF 64 STORIES

The Associated Press

April 18, 1986, Friday, AM cycle

SECTION: Domestic News

LENGTH: 656 words

HEADLINE: Titan Space Rocket Explodes; Believed Carrying Spy Satellite

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Missile-Blast

BODY:

... launch area," he said.

"A great red-orange puff of smoke came up," said Victor A. Sanchez, who was working nearby. "It shook the whole ground."

St. John would not speculate about the booster's payload. An Air Force statement released in Washington said the payload was classified.

But it was almost certain the rocket was carrying a refurbished model of the KH-11 photographic reconaissance satellite or a previously unknown satellite, said Stares and Jeffrey Richelson, a military reconaissance expert at American University in Washington.

The KH-11 believed aboard was intended to be a test model but was refurbished after another Titan blew up after launch at Vandenberg on Aug. 28, destroying a KH-11 and leaving only one of the satellites in orbit, said ...

... treaties "in a very precarious position," Richelson said.

A newer, more sophisticated spy satellite, the KH-12, is too big to be launched on expendable rockets and can be put into orbit only by a space shuttle, Richelson said. The shuttle program was halted in January after the Challenger exploded, killing seven astronauts.

"It would appear that we have at present no means of putting any more photographic reconaissance satellites into orbit until the shuttle is operating again," Richelson said, adding that the KH-11 in orbit has 1 1/2 years left in its useful lifespan.

If it fails before another satellite is launced, "we'll have no coverage whatsoever," Richelson said.

The Titan on Friday blew up about five seconds after liftoff, said an Air Force official in Washington who ...

LEVEL 1 - 20 OF 64 STORIES

April 19, 1986, Saturday, Final Edition

SECTION: First Section; A1

LENGTH: 786 words

HEADLINE: Space Program Suffers Setback as Titan Explodes

BYLINE: By Kathy Sawyer and Walter Pincus, Washington Post Staff Writers

KEYWORD: SPACE

BODY:

... Jan. 28, the accident jeopardizes the Defense Department's ambitious program to place U.S. military intelligence gathering, communications and navigation gear into space.

It was the second Titan 34D catastrophe in a row, following seven successes, Air Force officials said, while expressing some bafflement. Last Aug. 28, one of the workhorse rockets exploded after launch, destroying an $800 million KH11 photo reconnaissance satellite it was to carry into orbit.

The postponement in the shuttle program and now the failure of two Titans apparently leaves the Air Force with no capability to launch heavier satellites.

Last year, two-thirds of the Pentagon's most critical payloads went on the shuttle or the Titan.

Titans were scheduled this year to carry two of the Pentagon's Defense Satellite Communications System III (DSCS), the newest satellites that provide super-high-frequency ...

LEVEL 1 - 19 OF 64 STORIES

April 19, 1986, Saturday, AM cycle

SECTION: Domestic News

LENGTH: 817 words

BYLINE: By ALLEN GREENBERG

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Titan

BODY:

... ability to boost heavy payloads into orbit.

The last launch, on Aug. 25, blew up about two minutes after lift-off from Vandenberg. That failure was blamed on the premature shutdown of one of the rocket's two liquid-fueled first stage engines.

Although Air Force officials would only describe the payload lost Friday as classified, experts said the Titan probably was carrying a $100 million photo - reconnaissance satellite, the KH-11, a designation for the military codeword Keyhole.

The United States now has only one such satellite in orbit, and the new loss could endanger efforts to monitor such situations as Soviet troop movements and turbulence in the Middle East.

The explosion's impact was heightened by the destruction of the shuttle Challenger Jan. 28. Shuttles have been grounded until sometime next year and the two Titan failures probably will force ...

LEVEL 1 - 18 OF 64 STORIES

April 19, 1986, Saturday, PM cycle

SECTION: Domestic News

LENGTH: 448 words

HEADLINE: SPY SATELLITE REPORTED LOST IN TITAN BLAST, 58 TREATED

BYLINE: By Ronald Clarke

DATELINE: VANDENBERG AIR BASE, Calif.

KEYWORD: MISSILE

BODY:

... blow to the U.S. military's space delivery program, already curtailed by the suspension of shuttle flights after the January 28 Challenger disaster.

Military officials would say only that the Titan was carrying a secret military payload when it exploded 300 feet above the base.

But independent scientists who closely follow the space program said they believed the missile was to have launched a $800 million KH-11 photo reconnaissance satellite, used to monitor Soviet missile and other activities.

This would mean only one KH-11 satellite was operating and would seriously hamper the U.S. monitoring program, the scientists said.

The explosion of the $65 million Titan 34-D rocket, the most advanced of the series, was the third setback in eight months for the U.S. military satellite program.

The military has relied on missiles to launch its space payloads since the Challenger explosion, which ...

LEVEL 1 - 17 OF 64 STORIES

April 19, 1986, Saturday, AM cycle

SECTION: Domestic News

LENGTH: 812 words

HEADLINE: SPY CRAFT REPORTED DESTROYED IN TITAN BLAST, 58 TREATED

BYLINE: By Ronald Clarke

DATELINE: VANDENBERG AIR BASE, Calif.

KEYWORD: MISSILE

BODY:

... missile carrying a spy satellite worth $800 million blew up after launch last August 28.

Military officials would say only today's Titan was carrying a secret military payload when it exploded 300 feet above the base.

But independent scientists, who closely follow the space program, said they believed the missile was to have launched a multi-million dollar KH-11 photo reconnaissance satellite, used to monitor Soviet missile and other activities.

This would leave only one KH-11 satellite in the skies at present and would seriously hamper the U.S. monitoring program, the scientific observers said.

The orange and white toxic cloud yesterday dispersed after drifting towards the Pacific, but not before schoolchildren in the nearby town of Lompoc had been told to stay in their classrooms.

Highway and rail traffic also was halted to ...

... sour-smelling cloud descended on their town after the blast.

Titan missiles were placed in silos in Arizona and Kansas as well as in Arkansas, but they are being replaced by the solid fuel MX missiles.

The Air Force also refused to identify the payload aboard on the booster that exploded over Vandenburg last August, but published reports at the time identified it as a KH-11 photo -intelligence spy satellite.

Pentagon officials, who asked not to be identified, expressed disappointment at today's explosion.

They said they did not know what effect it would have on military launches, which have been backed up by the suspension of the shuttle program caused by the Challenger disaster, which killed seven astronauts.

The Titan, built by the Martin Marietta Corp., is America's standard heavy-duty space workhorse booster and is used for both military and non- ...

LEVEL 1 - 16 OF 64 STORIES

The New York Times

April 19, 1986, Saturday, Late City Final Edition

SECTION: Section 1; Page 1, Column 2; National Desk

LENGTH: 855 words

HEADLINE: TITAN ROCKET EXPLODES OVER CALIFORNIA AIR BASE

BYLINE: By WILLIAM J. BROAD, Special to the New York Times

DATELINE: VANDENBERG AIR FORCE BASE, Calif., April 18

BODY:

... in Washington, said, ''It's a real crisis.''

The space shuttles, which also carry large military satellites into orbit, have been grounded while investigators seek the cause of the explosion Jan. 28 of the shuttlecraft Challenger, which killed its crew of seven. Meanwhile, the military has been forced to rely on unmanned rockets, particulary the Titan, for launching satellites and other military payloads.

The payload lost today was almost certainly a KH-11 photographic reconaissance satellite, according to Dr. Stares and Stephen Daggett, a senior analyst with the Center for Defense Information, a nonprofit organization based in Washington.

Dr. Stares said that the explosion ''compounds the problems we're already having with the shuttle.'' He said a KH-11 costs about $500 million, and that if one were destroyed today ''it means that the United States is currenty dependent on a single reconnaissance satellite in ...

LEVEL 1 - 15 OF 64 STORIES

APRIL 19, 1986, SATURDAY, PM CYCLE

LENGTH: 449 words

HEADLINE: SPY SATELLITE REPORTED LOST IN TITAN BLAST, 58 TREATED

BYLINE: BY RONALD CLARKE

DATELINE: VANDENBERG AIR BASE, CALIFORNIA, APRIL 19

KEYWORD: MISSILE

BODY:
... SPACE DELIVERY PROGRAMME, ALREADY CURTAILED BY THE SUSPENSION OF SHUTTLE FLIGHTS AFTER THE JANUARY 28 CHALLENGER DISASTER.

MILITARY OFFICIALS WOULD SAY ONLY THAT THE TITAN WAS CARRYING A SECRET MILITARY PAYLOAD WHEN IT EXPLODED 300 FEET (90 METRES) ABOVE THE BASE.

BUT INDEPENDENT SCIENTISTS WHO CLOSELY FOLLOW THE SPACE PROGRAMME SAID THEY BELIEVED THE MISSILE WAS TO HAVE LAUNCHED A 800-MILLION-DOLLAR KH-11 PHOTO RECONNAISSANCE SATELLITE, USED TO MONITOR SOVIET MISSILE AND OTHER ACTIVITIES.

THIS WOULD MEAN ONLY ONE KH-11 SATELLITE WAS OPERATING AND WOULD SERIOUSLY HAMPER THE U.S. MONITORING PROGRAMME, THE SCIENTISTS SAID.

THE EXPLOSION OF THE TITAN 34-D ROCKET, THE MOST ADVANCED OF THE SERIES, WAS THE THIRD SETBACK IN EIGHT MONTHS FOR THE U.S. MILITARY SATELLITE PROGRAMME.

THE MILITARY HAS RELIED ON MISSILES TO LAUNCH ITS SPACE PAYLOADS SINCE THE CHALLENGER EXPLOSION, WHICH KILLED THE CREW OF ...

LEVEL 1 - 14 OF 64 STORIES

APRIL 19, 1986, SATURDAY, AM CYCLE

LENGTH: 452 words

HEADLINE: .S. SATELLITE LAUNCHES SUFFER SETBACK IN TITAN EXPLOSION

BYLINE: BY JACQUELINE FRANK

DATELINE: WASHINGTON, APRIL 19

KEYWORD: MISSILE

BODY:

... PAYLOADS)," AN AIR FORCE SPOKESMAN SAID.

A 65 MILLION DOLLAR TITAN 34-D MISSILE CARRYING A SECRET MILITARY PAYLOAD EXPLODED FIVE SECONDS AFTER LIFTOFF YESTERDAY AT VANDENBERG AIR FORCE BASE IN SOUTHERN CALIFORNIA.

INDEPENDENT SCIENTISTS WHO CLOSELY FOLLOW THE SPACE PROGRAMME SAID THEY BELIEVED THE TITAN WAS CARRYING AN 800 MILLION DOLLAR KH-11 PHOTO RECONNAISSANCE SATELLITE, USED TO MONITOR SOVIET MISSILE AND OTHER ACTIVITIES.

PENTAGON OFFICIALS SAID THEY HAD NO IDEA HOW LONG AN INVESTIGATION INTO THE CAUSE OF THE BLAST WOULD DELAY FUTURE SATELLITE LAUNCHES.

"IT'S GOING TO TAKE A WHILE TO SEE WHAT WE HAVE GOT HERE IN THE WAY OF DIFFICULTY. IT'S TOO SOON TO TELL," THE AIR FORCE SPOKESMAN SAID.

HEAVY PAYLOADS, SUCH AS ELECTRONIC COMMUNICATIONS SATELLITES WEIGHING ABOUT 25,000 POUNDS (11,300 KG), USUALLY ARE ...

... BLEW UP AFTER LAUNCH LAST AUGUST 28. AN INVESTIGATION OF THAT ACCIDENT SHOWED THERE HAD BEEN A LEAK IN THE LIQUID FUEL AND A FUEL PUMP FAILURE.

IF, AS THOUGHT BY INDEPENDENT SCIENTISTS, THE LATEST TITAN LAUNCH WAS TO PUT A REPLACEMENT ELECTRONIC SURVEILLANCE SATELLITE IN OPERATION, ITS LOSS COULD IMPEDE U.S. ABILITY TO MONITOR SOVIET ACTIVITIES. IT ALSO LEAVES THE UNITED STATES WITH ONLY ONE KH-11 PHOTO RECONNAISSANCE SATELLITE IN ORBIT.

MILITARY OFFICIALS WOULD SAY ONLY THAT THE TITAN 34-D WAS CARRYING A SECRET MILITARY PAYLOAD WHEN IT EXPLODED.

LEVEL 1 - 13 OF 64 STORIES

The Associated Press

April 19, 1986, Saturday, PM cycle

SECTION: Domestic News

LENGTH: 750 words

HEADLINE: Rocket Blast: 'Looked Like Atom Bomb'

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Rocket Blast

BODY:

... not endangered, the Air Force said. The toxic cloud was pushed out to sea by the wind.

Numerous grass fires caused by falling debris sputtered around the launch site for hours, but none was serious, base officials said in a statement. The only on-base evacuation was of 173 people initially pinned down at the site.

"This will create major problems in the photographic reconnaissance program, in our confidence in monitoring Soviet military activities at a critical time," said Paul Stares, a military space expert at the Brookings Institution in Washington, D.C.

In 1985, space shuttles and Titan 34Ds accounted for two-thirds of satellite launches, the Air Force said.

Although the Air Force said the payload was classified, the Titan almost certainly carried either a highly classified KH-11 photo reconnaissance satellite or a new, previously unknown spy satellite, said Stares and Jeffrey Richelson, a military reconnaissance expert at American University in Washington.

In the past, KH-11s have been the only satellites launched from Vandenberg on Titan 34D rockets, Richelson added.

The Air Force was conducting an investigation into the cause of Friday's explosion, said Lt. Gen. Jack L. Watkins, the base commander.

Like the ...

... row are pretty bad," Richelson said. "We had 50 successful launches in a row before this."

With the shuttles sidelined for at least a year, the back-to-back Titan failures apparently have left the nation with no means of launching heavy payloads.

The Associated Press, April 19, 1986

KH-11 satellites, in the view of experts, give the United States the ability to view objects as small as a license plate. Most recently, aerial photography from satellites or high-altitude spy planes played a key role in the bombing raids on Libya.

Such satellites also are used to monitor military movements and production and deployments of missiles.

If Friday's payload was a KH-11, Richelson said, then the explosion destroyed the last remaining such satellite. The United States now has only one KH-11 in orbit. The satellites are designed to operate in pairs.

Richelson and Stares said the ...

LEVEL 1 - 12 OF 64 STORIES

The Associated Press

April 19, 1986, Saturday, AM cycle

SECTION: Domestic News

LENGTH: 631 words

HEADLINE: Investigation Begins in Explosion of Air Force Rocket

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Rocket Blast

BODY:

... exploded in a fireball that showered the seaside launch pad with flaming debris and spread a huge toxic cloud of rocket propellants over the Santa Barbara County coast.

It was the second failed Titan 34D launch in a row. A rocket carrying a KH-11 spy satellite exploded just after liftoff Aug. 28.

"This will create major problems in the photographic reconnaissance program, in our confidence in monitoring Soviet military activities at a critical time," said Paul Stares, a military expert at the Brookings Institution.

The Titan booster cost $65 million, not including the cost of the secret payload, Maj. Gen. Jack L. Watkins said at a news conference Saturday. Some aerospace analysts say the payload could have been an important spy ...

... Space and Missile Center, will head the missile mishap board that is investigating the explosion, Watkins said. Col. Lee Heinz had been named earlier to temporarily head the panel.

The last previous launch of a Titan 34D, in August, ended in failure two minutes into the flight.

Although the Air Force said the payload was classified, the Titan almost certainly carried either a highly classified KH-11 photo reconnaissance satellite or a new, previously unknown spy satellite, Stares and Jeffrey Richelson, a military reconnaissance expert at American University in Washington, said Friday.

In the past, KH-11s have been the only satellites launched from Vandenberg on Titan 34D rockets, Richelson said.

Friday's explosion, coupled with the grounding of the space shuttle fleet after January's Challenger disaster, imperils the U.S. military spy satellite ...

LEVEL 1 - 11 OF 64 STORIES

April 20, 1986, Sunday, Final Edition

SECTION: First Section; A1

LENGTH: 1047 words

HEADLINE: Titan O-Rings Being Probed By Air Force;
Explosion Cancels Defense Missions

BYLINE: By Jay Mathews, Washington Post Staff Writer; Staff writer Michael Isikoff contributed to this report.

DATELINE: VANDENBERG AIR FORCE BASE, Calif., April 19, 1

KEYWORD: TITAN

BODY:

... Aerospace Division, told a news conference here that the O-rings would be among a number of things considered by an Air Force panel investigating the mishap, but declined to say what investigators are focusing on.

Watkins indicated that the explosion will significantly delay further launches of the Titan 34D, which in the wake of the Challenger disaster was the only U.S. vehicle capable of carrying such heavy payloads as the $800 million KH11 photo reconnaissance satellite, which some experts said was aboard Friday.

The Air Force would not identify the lost satellite. Some experts also have speculated that the destroyed payload may have been a secret electronics communications satellite.

Last year, two-thirds of the Pentagon's most critical payloads traveled into space aboard the shuttle or the Titan. The shuttle appears to be grounded for at least a year, and all such launches aboard Titans will be canceled until ...

... Paul Stares, a military space expert at the Brookings Institution, said the national security implications may be so serious that President Reagan could be forced to order an emergency launch of the shuttle before design defects responsible for the Challenger accident are corrected.

Stares and Jeffrey Richelson, a military reconnaissance specialist at The American University, said the lost payload was probably a KH11 high-resolution photo reconnaissance satellite that is used to monitor arms control compliance and other developments inside the Soviet Union as well as troop movements in the Mideast and other trouble spots. "It's highly likely it was a KH11," said Richelson. "They are the only thing that has gone up from Vandenberg in the past that uses Titan 34Ds."

The Air Force reconnaissance system is designed to operate with two KH11s in orbit at a time, but ...

LEVEL 1 - 9 OF 64 STORIES

April 20, 1986, Sunday, AM cycle

SECTION: Washington Dateline

LENGTH: 618 words

BYLINE: By Jacqueline Frank

DATELINE: WASHINGTON

KEYWORD: MISSILE

BODY:

... launch (heavier payloads)," an Air Force spokesman said.

A $65 million Titan 34-D missile carrying a secret military payload exploded five seconds after liftoff yesterday at Vandenberg Air Force Base in southern California.

Independent scientists who closely follow the space program said they believed the Titan was carrying an $800 million KH-11 photo reconnaissance satellite, used to monitor Soviet missile and other activities.

Pentagon officials said they had no idea how long an investigation into the cause of the blast would delay future satellite launches.

"At this time we have no idea," the Air Force spokesman said. "It's going to take a while to see what we have got here in the way of difficulty. It's too soon to tell."

In California today, Vandenberg commander Maj. Gen. Jack ...

... blew up after launch last August 28. An investigation of that accident showed there had been a leak in the liquid fuel and a fuel pump failure.

If, as thought by independent scientists, the latest Titan launch was to put a replacement electronic surveillance satellite in operation, its loss could impede U.S. ability to monitor Soviet activities. It also leaves the United States with only one KH-11 photo reconnaisance satellite in orbit.

Military officials would say only that the Titan 34-D was carrying a secret military payload when it exploded 300 feet above the base.

Officials said they had no clue to the cause of the explosion. The Titan, built by Martin Marietta Corp., is the workhorse of the U.S. space program and is used to launch both military and civilian satellites.

LEVEL 1 - 8 OF 64 STORIES

The New York Times

April 20, 1986, Sunday, Late City Final Edition

SECTION: Section 4; Page 8, Column 1; Week in Review Desk

LENGTH: 261 words

HEADLINE: IDEAS & TRENDS;
Another Setback In U.S. Military's Satellite Program

BYLINE: By Katherine Roberts

BODY:

... seconds after liftoff at Vandenberg Air Force Base, Calif., destroying its secret military payload.

Since the suspension of space shuttle flights during an investigation into the causes of the explosion of the shuttle Challenger Jan. 28, the military has had to rely on unmanned rockets, especially the Titan, its largest, to launch satellites and other payloads.

Analysts said the payload lost last week was almost certainly a KH-11 photographic reconnaissance satellite, and if that is so the United States is relying on a single such device. ''If it should fail,'' said Dr. Paul B. Stares, a military space expert at the Brookings Institution in Washington, ''the U.S. would have no spy satellites over the Soviet Union'' to monitor the military and check compliance with arms-control agreements.

In the Challenger investigation, meanwhile, the remains of all seven crew members killed in the Jan. ...

LEVEL 1 - 7 OF 64 STORIES

The New York Times

April 20, 1986, Sunday, Late City Final Edition

SECTION: Section 1; Part 1, Page 1, Column 5; National Desk

LENGTH: 1152 words

HEADLINE: BLOW TO SECURITY SEEN IN THE LOSS OF TITAN MISSILE

BYLINE: By WILLIAM J. BROAD, Special to the New York Times

DATELINE: VANDENBERG AIR FORCE BASE, Calif., April 19

BODY:

The loss of a Titan rocket and its secret military payload here Friday appears to be a serious blow to the national security interests of the United States, according to aerospace experts outside the Government.

At worst, the experts said today, the loss of an advanced spy satellite, which is believed to have been carried by the Titan, will make the negotiating of arms control treaties with the Soviet Union more difficult. Photographs from such satellites are used to count missiles, to observe the Soviet military and to monitor compliance with arms control treaties.

Although Air Force officials will say only that the destroyed payload was secret, aerospace experts outside the Government believe it was a KH-11 photographic reconnaissance satellite that was meant to have been launched into polar orbit around the earth.

The $65 million Titan 34D and its secret payload exploded in flames just seconds after liftoff from bluffs overlooking the Pacific Ocean at this sprawling Air Force base.

The nation has only one KH-11 satellite in orbit, the experts said. Another KH-11 satellite - they usually operate in pairs - was lost last August when another ...

... since 1984. And the lifetime of those satellites is usually about 1,100 days. So we're down to a single spacecraft to verify any arms accord.''

''We've had other kinds of spy satellites in the past,'' he continued, ''but they've mostly been phased out in anticipation of more advanced versions to go on the shuttle.''

The military spy satellites are far more advanced than civilian satellites, which have been used for general photo reconnaissance but cannot approach the precision necessary for the military's purposes.

Method Sought for Launchings

The aerospace engineer said that to his knowledge, the next generation spy satellite, the KH-12, was meant to be launched only on the space shuttle, possibly this year. He said that if did not know if it could be modified to be

launched by an unmanned rocket. Such questions, he said, were probably getting close attention by the White House National ...

LEVEL 1 - 6 OF 64 STORIES

APRIL 20, 1986, SUNDAY, PM CYCLE

LENGTH: 311 words

HEADLINE: GENERAL SAYS TITAN BLAST PROBE WILL CONSIDER SABOTAGE

DATELINE: VANDENBERG AIR BASE, CALIFORNIA, APRIL 19

KEYWORD: MISSILE

BODY:

... TITAN 34-D MISSILE EXPLODED FIVE SECONDS AFTER LIFTOFF FROM THE BASE ABOUT 100 MILES (160 KM) NORTH OF LOS ANGELES, LEAVING THE U.S. MILITARY WITHOUT THE MEANS TO PLACE HEAVY PAYLOADS IN ORBIT.

SPACE PROGRAMME OFFICIALS WOULD NOT DISCLOSE THE TITAN'S PAYLOAD BUT INDEPENDENT SCIENTISTS WHO MONITOR SUCH FLIGHTS SAID THEY BELIEVED IT WAS AN 800 MILLION DOLLAR KH-11 PHOTO RECONNAISSANCE SATELLITE.

A BASE SPOKESMAN SAID A FINAL TALLY TODAY SHOWED 74 PEOPLE ON THE BASE WERE TREATED FOR SKIN AND EYE IRRITATION CAUSED BY TOXIC GASES RELEASED BY THE EXPLOSION.

THREE PEOPLE TAKEN TO HOSPITAL YESTERDAY HAVE BEEN DISCHARGED, HE SAID.

THE EXPLOSION WAS THE SECOND STRAIGHT TITAN FAILURE AND DEALT A SEVERE BLOW TO THE U.S. SPACE PROGRAMME, STILL REELING FROM THE SPACE SHUTTLE DISASTER IN ...

LEVEL 1 - 5 OF 64 STORIES

The Associated Press

April 20, 1986, Sunday, AM cycle

SECTION: Domestic News

LENGTH: 749 words

HEADLINE: Investigation Begins in Explosion of Air Force Rocket

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Rocket Blast

BODY:

... will be examined, said Watkins, commander of the 1st Strategic Aerospace Division.

"We had been watching this (launch) anxiously," Watkins said. "Coming hard on the heels of the Challenger loss, there was more apprehension. ... It's a setback."

Titan launches from the missile test center will be halted until the cause of the explosion is known, said Air Force Capt. Rick Sanford, a base spokesman.

"This will create major problems in the photographic reconnaissance program, in our confidence in monitoring Soviet military activities at a critical time," said Paul Stares, a military expert at the Brookings Institution.

The Titan booster cost $65 million, not including the cost of the secret payload, Watkins said. Some aerospace analysts say the payload could have been an important spy satellite.

Watkins said 74 people were examined at the base hospital ...

... Space and Missile Center, will head the missile mishap board that is investigating the explosion, Watkins said. Col. Lee Heinz had been named earlier to temporarily head the panel.

The last previous launch of a Titan 34D, in August, ended in failure two minutes into the flight.

Although the Air Force said the payload was classified, the Titan almost certainly carried either a highly classified KH-11 photo reconnaissance satellite or a new, previously unknown spy satellite, Stares and Jeffrey Richelson, a military reconnaissance expert at American University in Washington, said Friday.

In the past, KH-11s have been the only satellites launched from Vandenberg on Titan 34D rockets, Richelson said.

The Associated Press, April 20, 1986

Friday's explosion, coupled with the grounding of the space shuttle fleet after January's Challenger disaster, imperils the U.S. military spy satellite ...

LEVEL 1 - 2 OF 64 STORIES

The Associated Press

April 21, 1986, Monday, PM cycle

SECTION: Domestic News

LENGTH: 511 words

HEADLINE: Air Force Begins Probe of Titan Rocket Blast

DATELINE: VANDENBERG AIR FORCE BASE, Calif.

KEYWORD: Rocket Blast

BODY:

... apprehension. ... It's a setback."

The Titan booster cost $65 million, not including the cost of the secret payload, Watkins said. Some aerospace analysts say the payload could have been an important spy satellite.

Air Force Capt. Rick Sanford, a base spokesmam, said Titan launches from the missile test center will be halted until the cause of the explosion is known.

"This will create major problems in the photographic reconnaissance program, in our confidence in monitoring Soviet military activities at a critical time," said Paul Stares, a military expert at the Brookings Institution.

The solid rockets used for Titan launches are manufactured by United Technologies, Chemical Systems Division of Sunnyvale. The boosters used by the space shuttle are made by Morton Thiokol Inc. of Brigham City, Utah.

Calls to United ...

LEVEL 1 - 3 OF 64 STORIES

April 21, 1986, Monday

SECTION: National; Pg. 3

LENGTH: 814 words

HEADLINE: Titan explosion seen as blow to intelligence

BYLINE: By Scott Armstrong, Staff writer of The Christian Science Monitor

DATELINE: Los Angeles

BODY:

The explosion of a Titan rocket believed carrying a secret spy satellite appears to have dealt a serious blow to US monitoring capability. It could also have a major impact on arms-control process.

Although Air Force officials will only say the payload lost late last week was secret, aerospace experts believe it was a KH-11 photo - reconnaissance satellite. When US intelligence officials keep tabs on Soviet military maneuverings, they rely heavily on the KH-11.

The KH-11 is equipped with powerful cameras that send back photographs giving details of everything from Soviet troop movements to aircraft strength to nuclear missile inventories.

''The KH-11,'' says one aerospace analyst, ''is the workhorse of US spy satellites.''

Now, however, the US may be facing a blind spot in its ''eye-in-the-sky'' capability that could have national security implications. The US now has only one such satellite in orbit. It was launched in December 1984, and, with a life expectancy of only two to three years, may only last another year or so.

''You just can't exaggerate the importance of photo - reconnaissance to US intelligence gathering,'' says Dr. Paul Stares, a military-space expert at the Brookings Institution in Washington. ''There must be a lot of nervous people at the Pentagon right now.''

Lofting a similar satellite quickly appears difficult. Titan launches from the missile test center at Vandenberg Air Force Base near here will be halted until the cause of the explosion is known, says Air Force Capt. Rick Sanford, a base spokesman.

The only other US launch vehicle capable of carrying such a large payload - the space shuttle - is already grounded because of the destruction of Challenger last January.

''It is more serious than just affecting the military,'' says one aerospace expert who requested anonymity, noting the importance of photo - reconnaissance satellites in verifying compliance with arms-control treaties. ''It imperils the entire arms-control process.''

The Titan 34D was destroyed in a fiery explosion a few seconds after liftoff at Vandenberg's Launch Complex Four, about 130 miles northwest of Los Angeles. There were no serious injuries and damage was said to be limited to the launch complex itself. An investigation into the cause of the accident - not expected to be ...

... might have been done to US intelligence gathering capabilities.

KH-11 satellites operate in low-earth orbit and can be maneuvered to monitor specific areas of the earth.

They are considered valuable in keeping tabs on such things as troop movements and turbulence in the Middle East. Much of their time is believed to be spent looking in on the Soviets, since the US can't use another key source of intelligence-gathering, photo - reconnaissance from aircraft. The US won't violate Soviet airspace.

The US has other means of monitoring the Soviets from space. This includes picking up signals with early-warning and electronic surveillance satellites.

But the KH-11 satellites have a few trump cards. They take photos and beam them to ground stations instantly. The US, experts say, have ''close look'' satellites that are sent up for short periods of time, mainly to monitor crises. These ...

... instantly but drop film for mid-air interception by specially equipped planes.

The KH-11s are also considered valuable in monitoring the production and deployment of nuclear missiles and ver.fying arms-control treaties. The US usually has two of the big satellites operating at any given time. With only one on orbit now, it leaves the US in a precarious position.

''Our total strategic photo reconnaissance is hanging on one satellite,'' says Curtis Peebles, an aerospace analyst who has written widely on military-space issues.

Some experts say the shuttle is the only vehicle that can launch the next photo - reconnaissance satellite in the series, the KH-12. So, with the shuttle program grounded, it could be a long time before it sees duty.

LEVEL 1 - 4 OF 64 STORIES

Financial Times

April 21, 1986, Monday

SECTION: SECTION I; Overseas News; Pg. 4

LENGTH: 206 words

HEADLINE: US Cancels Launches Of Titan Rockets

BYLINE: Nancy Dunne, Washington

BODY:

... agree on future plans for the shuttle, and the loss of the Titan, even temporarily, will complicate policy formulation further.

With the shuttle grounded for at least another year, military officials have been insisting that for reasons of national security their payloads will have to dominate the shuttle schedule when flights are resumed. The cancellation of the Titan may strengthen their case.

The secret payload carried on Friday is believed to have been a KH-11 photographic reconnaissance satellite headed for a polar orbit around the earth. KH-11s usually operate in pairs, but there is just one now in orbit and another is thought to have been destroyed in the last Titan accident in August.

The KH-11 can provide details of Soviet arms control compliance and troop movements. The accident may, therefore, hinder US-Soviet attempts to conclude arms control agreements.

LEVEL 1 - 1 OF 64 STORIES

Financial Times

April 22, 1986, Tuesday

SECTION: SECTION I; American News; Pg. 3

LENGTH: 699 words

HEADLINE: Titan Crash 'Creates Pentagon Blindspot'

BYLINE: Peter Marsh

BODY:

The US may be without any functioning photographic spy satellites after last Friday's explosion of a Titan 34-D rocket carrying a secret payload, making the outlook for Pentagon intelligence gathering rather worse than had previously been thought.

That is the theory of Mr Anthony Kenden, a UK aerospace expert, who says that the Titan may have been intended to put in orbit a replacement for a previous spy craft that had become faulty.

Hitherto, it has been ...

... modern spy satellite.

The Pentagon normally likes to keep in orbit at any time two KH-11 craft. The vehicles carry high resolution cameras to take photos of specific spots on the earth's surface, one satellite flying over a certain area in the morning and the other in the afternoon.

The KH-11 vehicles can be supplemented periodically by special "close look" satellites to take photos of areas that are particulary interesting in military terms, the Middle East for instance.

Mr Kenden bases his reasoning about the inoperation of the current KH-11 craft on the fact that the launch of Friday's Titan, which exploded seconds after lift-off from the Vandenberg Air Force Base in California, took place in the morning.

It had been due to place in orbit a KH-11 vehicle which would have zoomed ...